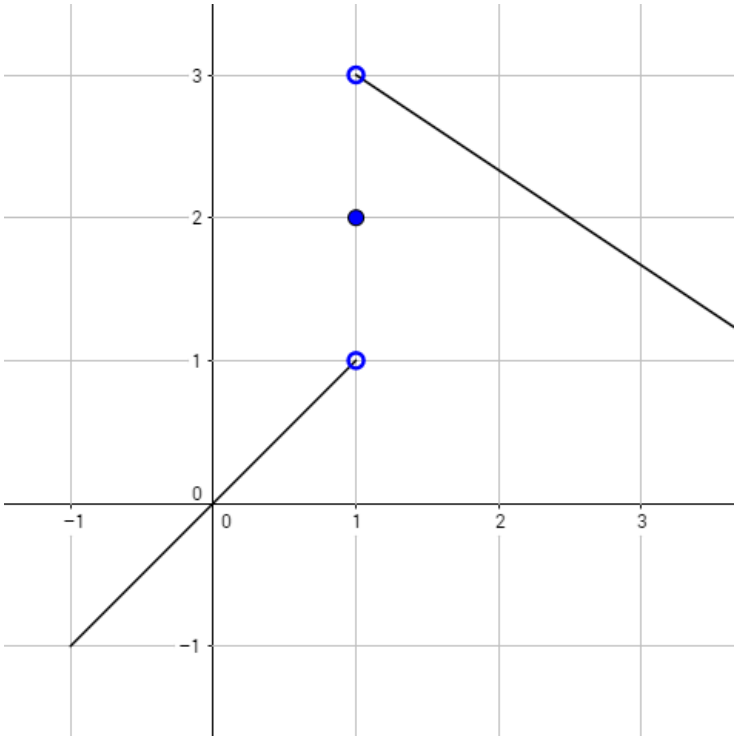
Name: Solutions **Section**: 022

Clear your desk of everything excepts pens, pencils and erasers. **Show all your work.**
If you have a question raise your hand and I will come to you.

1. Let $f(x)$ be the function in the graph below.



Evaluate each of the following expressions. If the limit does not exist write DNE. (1pt each)

(a) (1 point) $\lim_{x\to 1^-} f(x) = 1$

(b) (1 point) $\lim_{x\to 1^+} f(x) = 3$

(c) (1 point) $\lim_{x\to 1} f(x) = DNE$

(d) (1 point) $f(1) = 2$

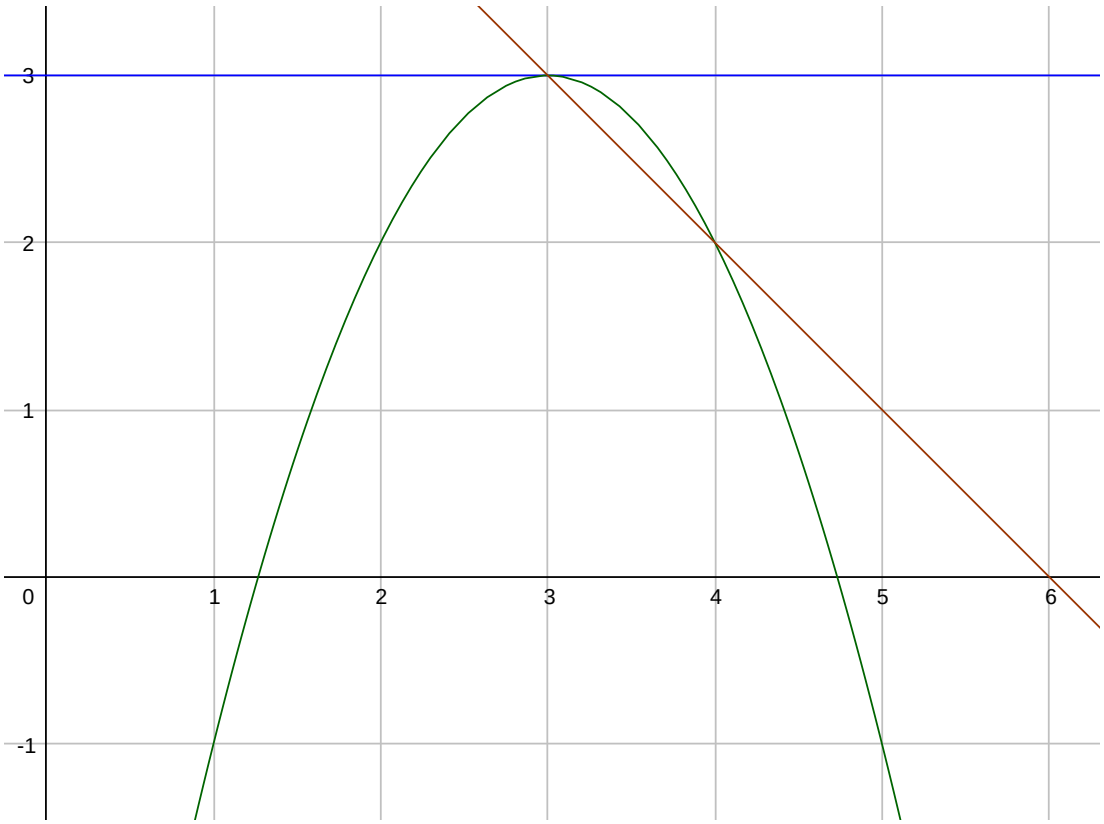
Continue on to back side

2. Let $f(x) = -(x-3)^2 + 3$.

(a) (3 points) Compute the **average rate of change** for the interval $1 \leq x \leq 3$.

$$\begin{aligned} ARoC(1 \leq x \leq 3) &= \frac{f(3) - f(1)}{3 - 1} \\ &= \frac{(-(3-3)^2 + 3) - (-(1-3)^2 + 3)}{2} \\ &= \frac{4}{2} = 2. \end{aligned}$$

(b) (3 points) The following is a graph of the function $f(x) = -(x-3)^2 + 3$.
Sketch the **secant line (red line)** corresponding to the interval $3 \leq x \leq 4$.
Sketch the **tangent line (blue line)** corresponding the $x = 3$.



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